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|-----------------|-------------|----------------------|---------------------|------------------|
| 10/653,688      | 09/02/2003  | Steven P. Nolan      | A02194US (98016.23) | 3477             |

22920 7590 05/09/2005

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EXAMINER

SHIAO, REI TSANG

ART UNIT

PAPER NUMBER

1626

DATE MAILED: 05/09/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

|                              |                                      |                                         |  |
|------------------------------|--------------------------------------|-----------------------------------------|--|
| <b>Office Action Summary</b> | <b>Application No.</b><br>10/653,688 | <b>Applicant(s)</b><br>NOLAN, STEVEN P. |  |
|                              | <b>Examiner</b><br>Robert Shiao      | <b>Art Unit</b><br>1626                 |  |

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

#### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

- 1) ☒ Responsive to communication(s) filed on responses filed on 03/07, 2005.
- 2a) ☐ This action is **FINAL**.      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

- 4) ☒ Claim(s) 1-20 is/are pending in the application.
- 4a) Of the above claim(s) 13 and 14 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-12 and 15-20 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

#### Attachment(s)

- |                                                                                                                                                 |                                                                                         |
|-------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)                                                                     | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                                                            | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date <u>10/07/2004</u> . | 6) <input type="checkbox"/> Other: _____                                                |

### DETAILED ACTION

1. This application claims benefit of the provisional application: 60/407,073 with a filing date 08/30/2002.
2. Claims 1-20 are pending in the application.

### *Responses to Election/Restriction*

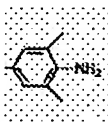
3. Applicant's election with traverse of Group I, claims 1-12 and 15-17, in the reply filed on March 07, 2005, is acknowledged. The traversal is on the grounds that (1) both Group I and Group III are drawn to a method of preparing an imidazolium salt; and (2) claims 13-14 of Group II needs to be examined at the same time as the rest of the claims, as doing so should require no substantial additional work on the part of the Patent Office. This is found persuasive, in part, and the reasons are given, *infra*.

### *Status of the Claims*

4. Claims 1-20 are pending in the application. The scope of the invention of the elected subject matter is as follows:

Claims 1-12, 15-17, drawn to a process, classified in class 548.

Inventions of Groups I, III and Group II are independent and distinct processes and products because starting materials, i.e., diimine compounds No. 1 or 3, a



compound of formula , solvent, catalyst, and reaction conditions of each group differ in elements, bonding arrangement and chemical property to such an extent that a

reference anticipating processes of making of any one group would not render another group obvious.

Additionally, each of these inventions contains a plurality of patentably distinct processes or products, i.e., claims 13-14 of Group II, also far too numerous to list individually. Moreover, the examiner must perform a commercial database search on the subject matter of each group in addition to a paper search, which is quite burdensome to the examiner. Claims 1-12 and 15-20 are prosecuted in the case. Claims 13-14 are withdrawn from further consideration pursuant to 37 CFR 1.142(b), as being drawn to a nonelected invention.

The requirement is still deemed proper and is therefore made **FINAL**.

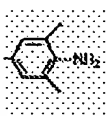

***Claim Rejections - 35 USC § 112***

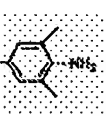

5. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

Claims 1-12 and 15-20 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claims contains subject matter "synthesizing a diimine compound", "ring closure conditions", or "providing a diimine compound" without limitation, which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventors, at the time the application was filed, had possession of the claimed invention, see claims 1 and 18, lines 1-2.

6. Claims 1-12 and 15-20 are rejected under 35 U.S.C. 112, first paragraph, because the specification, while being enabling for the instant processes using starting

materials  or , air and solvent of ring closing conditions, does not reasonably provide enablement for the instant processes for preparing a diimine

compound using starting materials other than  or , or a ring closure condition under without air or solvent. The specification does not enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to use the invention commensurate in scope with these claims.

For rejections under 35 U.S.C. 112, first paragraph, the following factors must be considered (In re Wands, 8 USPQ2d 1400, 1988):

- 1) Nature of invention.
- 2) State of prior art.
- 3) Level of ordinary skill in the art.
- 4) Level of predictability in the art.
- 5) Amount of direction and guidance provided by the inventor.
- 6) Existence of working examples.
- 7) Breadth of claims.
- 8) Quantity of experimentation needed to make or use the invention based on the content of the disclosure.

See below:

1) Nature of the invention

The claims are drawn to a process of making imidazolium salt comprising "synthesizing a diimine compound", "ring closure conditions", or "providing a diimine compound" without limitation of "synthesizing or providing diimine compound" or "ring closure conditions".

2) State of the prior art

The reference Nolan et al. US 6,316,380 does not indicate which compounds of instant processes may be useful in the claimed invention. Nolan et al. '380 is pertaining to catalyst system comprising transition metal and imidazoline-2-ylidene or imidazolidine-2ylidene.

3) Level of ordinary skill in the art.

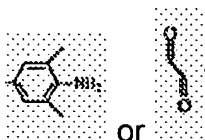
The level of ordinary skill in the art is high. The claims are drawn to a process of making imidazolium salt comprising "synthesizing a diimine compound", "ring closure conditions", or "providing a diimine compound" without limitation of "synthesizing or providing diimine compound" or "ring closure conditions" by the instant examples disclosed in the specification.

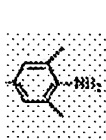

4) Level of predictability in the art.

The claims are drawn to a process of making imidazolium salt comprising "synthesizing a diimine compound", "ring closure conditions", or "providing a diimine compound" without limitation of "synthesizing or providing diimine compound" or "ring closure conditions", there would be little predictability in the scope of claimed processes.

5) Amount of direction and guidance provided by the inventor.

The claims are drawn to a process of making imidazolium salt comprising "synthesizing a diimine compound", "ring closure conditions", or "providing a diimine compound" without limitation of "synthesizing or providing diimine compound" or "ring closure conditions", i.e., processes for preparing a diimine compound using



starting materials other than  or , or a ring closure condition under without air or solvent, which are neither enabled nor supported in the specification.

6) Existence of working examples.

The claims are drawn to a process of making imidazolium salt comprising "synthesizing a diimine compound", "ring closure conditions", or "providing a diimine compound" without limitation of "synthesizing or providing diimine compound" or "ring closure conditions", encompasses a vast number of processes. Applicant's limited working examples do not enable the public to use such a numerous amount of "a process of making imidazolium salt comprising "synthesizing a diimine compound", "ring closure conditions", or "providing a diimine compound" without limitation of "synthesizing or providing diimine compound" or "ring closure conditions"", however, the specification provides only limited examples of processes.

7) Breadth of claims.

The claims are extremely broad due to the vast number of possible "a process of making imidazolium salt comprising "synthesizing a diimine compound", "ring closure

conditions", or "providing a diimine compound" without limitation of "synthesizing or providing diimine compound" or "ring closure conditions".

8) Quantity of experimentation needed to make or use the invention based on the content of the disclosure.

The specification did not enable any person skilled in the art to which it pertains to make or use the invention commensurate in scope with this claim. In particular, the specification failed to enable the skilled artisan to practice the invention without undue experimentation. The skilled artisan would have a numerous process in order to obtain "a process of making imidazolium salt comprising "synthesizing a diimine compound", "ring closure conditions", or "providing a diimine compound" without limitation of "synthesizing or providing diimine compound" or "ring closure conditions"" as claimed. Based on the unpredictable nature of the invention and state of the prior art and the extreme breadth of the claims, one skilled in the art could not perform the claimed compounds without undue experimentation, see *In re Armbruster* 185 USPQ 152 CCPA 1975. Incorporation of the limitation "a process of making imidazolium salt comprising "synthesizing a diimine compound", "ring closure conditions", or "providing a diimine compound" without limitation of "synthesizing or providing diimine compound" or "ring closure conditions"" would obviate the rejection, i.e., claims 9-11.

7. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.



Claims 3-4 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claims 3-4, line 1, recites the limitation "compound is **1**" or "compound is **3**", fails to particularly point out and distinctly claim the subject matter which applicant regards as the invention. Claims must stand alone to define invention, and incorporation into claims by express reference to specification is not permitted, are properly rejected under 35 U.S.C. 112, second paragraph, see Ex parte Fressola, No. 93-0828. Incorporation of the named compounds of compound is **1** or **3** into the claim would obviate the objection.

***Claim Rejections - 35 USC § 102***

8. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

9. Claims 1-12 and 15-17 are rejected under 35 U.S.C. 102(b) as being anticipated by Arduengo et al. publication, Tetrahedron, 1999, 55:14523-14534.

Applicants claim a process of preparing imidazolium salt comprising (a) synthesizing a diimine compound; and (b) subjecting the diimine compound to ring closure conditions. The instant processes have been found on the page 1-10 of the specification.

Arduengo et al. disclose a process of making imidazolnium salts (i.e., 3a, b compounds) by (1) synthesizing a diimine compound, i.e., glyoxal diimines of compounds 1a, b were obtained by reacting glyoxal with 2,4,6-trimethylphenylamine or 2,6-diisopropylphenylamine; and (2) cyclization or ring closure conditions occurred with formation of the imidazolinium by adding acid HCl in the presence of solvent tetrahydrofuran (i.e., thf). Therefore, Arduengo et al. processes meet the required elements of instant claims, see Scheme 1 on page 14523, and page 14524, lines 1-30.

10. Claims 1-12 and 15-20 are rejected under 35 U.S.C. 102(b) as being anticipated by Jafarpour et al. publication, J. of Organometallic Chemistry, 2000, 606:49-54.

Applicants claim (i.e., claim 1) a process of preparing imidazolium salt comprising (a) synthesizing a diimine compound; and (b) subjecting the diimine compound to ring closure conditions.

Applicants also claim (i.e., claim 18) a process of preparing imidazolium salt comprising (a) providing a diimine compound from the group consisting of 1 or 3; (b) mixing the diimine compound with a solvent; and ( c) mixing the diimine compound and solvent with formalaldehyde and acid. The instant processes have been found on the pages 1-10 of the specification.

Jafarpour et al. disclose a process of making imidazolnium salts (i.e., IPrHCl compounds) by (1) synthesizing a diimine compound, i.e., a compound diazabutadiene were obtained by reacting glyoxal with 2,6-diisopropylphenylamine; and (2) cyclization

or ring closure conditions occurred with formation of the imidazolinium salt compound (i.e., IPrHCl compound) by adding acid HCl and formaldehyde in the presence of solvent toluene to obtain imidazolinium salt compound(i.e., IPrHCl compound). Therefore, Jafarpour et al. processes meet the required elements of instant claims (i.e., claims 1 or 18), see page 50, Scheme 1 and lines 1-40.

### ***Claim Rejections - 35 USC § 103***

11. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein

were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(f) or (g) prior art under 35 U.S.C. 103(a).

“Even though product-by-process claims are limited by and defined by the process, determination of patentability is based on the product itself. The patentability of a product does not depend on its method of production. If the product in the product-by-process claim is the same as or obvious from a product of the prior art, the claim is unpatentable even though the prior product was made by a different process.” In re Thorpe, 777 F.2d 695, 698, 227 USPQ 964, 966 (Fed. Cir. 1985). Also see M.P.E.P. 2113.

**12.** Claims 1-12 and 15-20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Arduengo et al. publication, Tetrahedron, 1999, 55:14523-14534.

Applicants claim (i.e., claim 1) a process of preparing imidazolium salt comprising (a) synthesizing a diimine compound; and (b) subjecting the diimine compound to ring closure conditions.

Applicants also claim (i.e., claim 18) a process of preparing imidazolium salt comprising (a) providing a diimine compound from the group consisting of **1** or **3** ; (b) mixing the diimine compound with a solvent; and ( c) mixing the diimine compound and solvent with formalaldehyde and acid. The instant processes have been found on the pages 1-10 of the specification.

**Determination of the scope and content of the prior art (MPEP §2141.01)**

Arduengo et al. disclose a process of making imidazolnium salts (i.e., 3a, b compounds) by (1) synthesizing a diimine compound, i.e., glyoxal diimines of compounds 1a, b were obtained by reacting glyoxal with 2,4,6-trimethylphenylamine or 2,6-diisopropylphenylamine; and (2) cyclization or ring closure conditions occurred with formation of the imidazolinium by adding acid HCl in the presence of solvent tetrahydrofuran (i.e., thf), see Scheme 1 on page 14523, and page 14524, lines 1-30.

**Determination of the difference between the prior art and the claims (MPEP §2141.02)**

The difference between the instant claims and Arduengo et al. is that the instant claims (i.e., claim 1) silence the named diimine compounds of the processes and a protic acid is used (i.e., claim 18), while Arduengo et al. diimine compounds are 2,4,6-trimethylphenylamine or 2,6-diisopropylphenylamine and HCl is used.

**Finding of prima facie obviousness-rational and motivation (MPEP §2142-2143)**

One having ordinary skill in the art would find the claims 1-12 and 15-20 prima facie obvious because one would be motivated to employ the processes of Arduengo et al., wherein imidazolium salt is prepared by comprising (a) synthesizing a diimine compound; and (b) subjecting the diimine compound to ring closure conditions, i.e., solvent and acid are used.

The motivation to make the claimed compounds derives from the expectation that the instant claimed processes would possess similar yields from the known Arduengo et al. processes to that which is claimed in the reference.

**13.** Claims 1-12 and 15-20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Jafarpour et al. publication, J. of Organometallic Chemistry, 2000, 606:49-54.

Applicants claim (i.e., claim 1) a process of preparing imidazolium salt comprising (a) synthesizing a diimine compound; and (b) subjecting the diimine compound to ring closure conditions.

Applicants also claim (i.e., claim 18) a process of preparing imidazolium salt comprising (a) providing a diimine compound from the group consisting of **1** or **3** ; (b) mixing the diimine compound with a solvent; and ( c) mixing the diimine compound and solvent with formaldehyde and acid. The instant processes have been found on the pages 1-10 of the specification.

**Determination of the scope and content of the prior art (MPEP §2141.01)**

Jafarpour et al. disclose a process of making imidazolnium salts (i.e., IPrHCl compounds) by (1) synthesizing a diimine compound, i.e., a compound diazabutadiene were obtained by reacting glyoxal with 2,6-diisopropylphenylamine; and (2) cyclization or ring closure conditions occurred with formation of the imidazolinium salt compound (i.e., IPrHCl compound) by adding acid HCl and formaldehyde in the presence of

solvent toluene to obtain imidazolium salt compound(i.e., IPrHCl compound).

**Determination of the difference between the prior art and the claims (MPEP**

**§2141.02)**

The difference between the instant claims and Jafarpour et al. is that the instant claims (i.e., claim 1) silence the named diimine compounds of the processes and a protic acid is used (i.e., claim 18), while Jafarpour et al. diimine compound is 2,6-diisopropylphenylamine and HCl is used.

**Finding of prima facie obviousness-rational and motivation (MPEP §2142-2143)**

One having ordinary skill in the art would find the claims 1-12 and 15-20 prima facie obvious because one would be motivated to employ the processes of Jafarpour et al., wherein imidazolium salt is prepared by comprising (a) synthesizing a diimine compound; and (b) subjecting the diimine compound to ring closure conditions, i.e., solvent, formaldehyde, and acid are used.

The motivation to make the claimed compounds derives from the expectation that the instant claimed processes would possess similar yields from the known Jafarpour et al. processes to that which is claimed in the reference.

***Telephone Inquiry***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Robert Shiao whose telephone number is (571) 272-

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0707. The examiner can normally be reached on 8:30 AM - 5:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Joseph K. McKane can be reached on (571) 272-0699. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.


Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



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May 05, 2005